

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Art Unit : 3633
Examiner : Jeanette E. Chapman
Appln. No. : 10/726,341
Applicants : Philip C. Georgeau and Lisa A. Mulder
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Confirmation No. : 9027
For : ROOFING SYSTEM AND METHOD

APPEAL BRIEF (37 CFR §41.37(a))

This brief is in furtherance of the Notice of Appeal filed in this case on February 29, 2008.

The \$255.00 fee required under §41.20(b)(2) is enclosed. An extension for a period of two months of time to file an Appeal Brief is also enclosed. If any additional fee is required, Appellants ask that the fee be charged to Deposit Account No. 16 2463.

This brief contains these items under the following headings, and in the order set forth below (37 CFR §41.37(c)(1)):

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I. Real Party in Interest

The real party in interest in this application is Chem Link, a Michigan Corporation.

II. Related Appeals and Interferences

Appellants are aware of no other appeals or interferences that would directly affect or be directly affected by, or have a bearing on, the Board's decision in the pending appeal.

III. Status of Claims

Claims 1-27 are pending in the application. Claims 1-27 are rejected. This is an appeal of the rejection of claims 1-27.

IV. Status of Amendments

All amendments filed in this application have been entered.

V. Summary of Claimed Subject Matter

The present invention relates to a non-hazardous, environmentally friendly roof structure 2 (page 4, line 2) (Figs. 1 and 2) that may include a metal deck 3 (page 4, line 2) and a roof substrate such as a layer of insulation 4 (page 4, line 3). A moisture curing adhesive, such as a non-volatile polyether-based adhesive is disposed on a portion of a first side 8 (page 4, line 5) of waterproof membrane 5 (page 4, line 3).

As discussed at page 4, line 17 – page 5, line 2, the moisture curing adhesive does not generate toxic vapors, and also does not require immediate application of the membrane as with existing two-part polyurethane foam sprayed systems. Furthermore, this adhesive can be used at temperatures below 40°, and it is not adversely affected by wind or the like during application. The adhesive develops tensile strength of about 200 lbs. per square foot, and therefore provides a very strong bond between membrane 5 (page 4, line 3) and roof substrate 4 (page 5, line 1).

As discussed at page 8, lines 18-29, the moisture curing adhesive may also be utilized to bond insulation board to a fluted steel deck, and fiberglass reinforced gypsum board may be bonded to the insulation board utilizing the moisture curing adhesive. A waterproof membrane may then be bonded to the gypsum board using moisture curing adhesive. Test results show that this roof construction

substantially succeeds roofing industry standards, and it provides a substantial prior polyurethane foam systems.

1. Independent Claim 1

One aspect of the invention, as recited in independent claim 1, is a roof deck structure 1 (page 4, line 1) for covering a roof substrate 4 (page 5, line 1). The roof structure includes a roof substrate 4 (page 5, line 1) having an upper surface. A waterproof membrane 5 (page 4, line 3) has an upper side and a lower side. The roof structure further includes moisture appear substantially non-volatile adhesive 7 (page 4, line 6) comprising a silyl-terminated polymer disposed on at least a portion of the lower side of the waterproof membrane 5 (page 4, line 3) in contact with the upper surface of the roof substrate 4 (page 5, line 1) and bonding the waterproof membrane 5 (page 4, line 3) to the roof substrate 4 (page 5, line 1) to define a portion of a low slope roof structure 2 (page 4, line 2) of a building structure.

2. Independent Claim 5

Claim 5 recites a roof deck structure 1 (page 4, line 1) including a rigid low slope roof structure 2 (page 4, line 2) adapted to be supported at least in part by the walls of a building. A low slope roof structure 2 (page 4, line 2) has a roof substrate 4 (page 5, line 1) defining an upper surface. A waterproof membrane 5 (page 4, line 3) has an upper side and a lower side. Moisture curing silyl-terminated polymer based adhesive 7 (page 4, line 6) is disclosed on at least a portion of the lower side of the waterproof membrane 5 (page 4, line 3) in contact with the upper surface of the roof substrate 4 (page 5, line 1), and bonding the waterproof membrane 5 (page 4, line 3) to the upper surface of the roof substrate 4 (page 5, line 1).

3. Dependent Claim 7

Claim 7 depends from claim 5, and recites that the waterproof membrane comprises a layer EPDM rubber that does not include fleece backing material.

4. Independent Claim 8

Independent claim 8 recites a roof deck structure 1 (page 4, line 1) including a rigid low slope roof structure 2 (page 4, line 2) including a roof substrate 4 (page 5, line 1) having an upper surface. A waterproof flexible membrane 5 (page 4, line 3) covers the roof substrate 4 (page 5, line 1), and defines a lower surface. A moisture curing substantially non-volatile adhesive 7 (page 4, line 6) comprising a silyl-terminated polymer is in contact with the upper surface of the roof substrate 4 (page 5, line 1) and the lower surface of the flexible membrane 5 (page 4, line 3) to thereby bond the flexible membrane 5 (page 4, line 3) to the roof substrate 4 (page 5, line 1).

5. Dependent Claim 10

Claim 10 depends from claim 9. Claim 9 recites that the adhesive 7 (page 4, line 6) comprises a silyl-terminated polyether based adhesive, and claim 10 recites that the flexible membrane 5 (page 4, line 3) "includes a layer of fleece mating 6 (page 4, line 4) on one side". Claim 10 further recites that at least a portion of adhesive 7 (page 4, line 6) is disposed in the fleece 6 (page 4, line 4).

6. Dependent Claim 13

Claim 13 depends from claim 8, and recites that the flexible membrane 5 (page 4, line 3) is bonded to the roof substrate 4 (page 5, line 1) and has a bond strength of at least 165 lbs. per square foot.

7. Independent Claim 16

Claim 16 recites a roof deck structure 1 including a rigid slope roof structure 2 (page 4, line 2) including a roof substrate comprising fiberglass reinforced gypsum board. A waterproof flexible membrane 5 (page 4, line 3) covers the roof substrate 4 (page 5, line 1). A moisture curing substantially non-volatile adhesive 7 (page 4, line 6) is disposed between the roof substrate 4 (page 5, line 1) and the flexible membrane 5 (page 4, line 3) to thereby bond the flexible member 5 (page 4, line 3) to the roof substrate 4 (page 5, line 1). The roof deck structure 1 (page 4, line 1) includes a layer of foam installation below the fiberglass reinforced gypsum board.

8. Independent Claim 17

Claim 17 recites a roof deck structure 1 (page 4, line 1) including a rigid low slope roof structure 2 (page 4, line 2) including foam insulation 4 (page 4, line 3) forming a roof substrate. A waterproof flexible membrane 5 (page 4, line 3) covers the roof substrate 4 (page 5, line 1). A moisture curing substantially non-volatile adhesive 7 (page 4, line 6) is disposed between the roof substrate 4 (page 5, line 1) and the flexible membrane 5 (page 4, line 3) to thereby bond the flexible membrane 5 (page 4, line 3) to the roof substrate 4 (page 5, line 1). The roof deck structure further includes a fluted steel deck 3 (page 4, line 2) below the foam insulation 4 (page 4, line 3), and moisture curing adhesive 7 (page 4, line 6) bonding the foam insulation 4 (page 4, line 3) to the steel deck 3 (page 4, line 2) without the use of mechanical fasteners.

9. Independent Claim 21

Independent claim 21 recites a roof deck structure 1 (page 4, line 1) including fluted steel deck 3 (page 4, line 2) having a plurality of elongated upper deck surfaces. A substantially rigid panel is disposed on the steel deck. The panel defines upper and lower surfaces. Moisture-curing adhesive 7 (page 4, line 6) is disposed between the steel deck 3 (page 4, line 2) and the substantially rigid panel in contact with the upper deck surfaces and the lower surface of the substantially rigid panel. A flexible waterproof membrane 5 (page 4, line 3) is disposed of the substantially rigid panel.

10. Dependent Claim 26

Claim 26 depends from claim 21, and recites that the waterproof membrane comprises a fleece-backed material.

11. Dependent Claim 27

Claim 27 depends from claim 21, and recites that the waterproof membrane 5 (page 4, line 3) comprises a fleece-backed PVC material.

VI. Grounds of Rejection to be Reviewed on Appeal

1. Claims 1-27 stand rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement.
2. Claims 1-2 and 4-15 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over the Venable U.S. Patent No. 4,996,812 in view of Georgeau et al. U.S. Patent No. 6,579,924.
3. Claim 3 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Venable U.S. Patent No. 4,996,812 in view of Georgeau et al. U.S. Patent No. 6,579,924 and further in view of Naipawer, III U.S. Patent No. 5,737,897.
4. Claims 5-14, 17-22, and 26 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Venable U.S. Patent No. 4,996,812 in view of Georgeau et al. U.S. Patent No. 6,579,924 and further in view of Van Wagoner U.S. Patent No. 4,719,723.
5. Claims 15-16 and 23-25 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Venable U.S. Patent No. 4,996,812 in view of Georgeau et al. U.S. Patent No. 6,579,924 and Van Wagoner U.S. Patent No. 4,719,723 and further in view of Beck U.S. Patent No. 4,498,267.
6. Claim 27 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Venable U.S. Patent No. 4,996,812 in view of Georgeau et al. U.S. Patent No. 6,579,924 and Van Wagoner U.S. Patent No. 4,719,723 and further in view of Naipawer, III U.S. Patent No. 5,737,987.

VII. Argument

A. The References

1. U.S. Patent No. 4,996,812 in the name of Venable.

Venable '812 discloses a method of membrane application in roof construction. A spray gun apparatus 16 (see Fig. 1) is used to apply an adhesive 15 that is preferably a two-component polyurethane adhesive, including polyol and diisocyanate components that are mixed within the body of the gun and sprayed onto a substrate 10. Immediately after application of the adhesive, a membrane 18

is placed in contact with the adhesive. Membrane 18 includes an upper flexible EPDM rubber layer 20 together with a non-woven polyester fleece layer 22 secured to the underside of the rubber layer. After membrane 18 is unrolled and positioned on the substrate, it is pressed into the adhesive layer by a soft 18-inch roller. At column 4, lines 15-17, Venable '812 states that the adhesive 15 is preferably a polyurethane foam system designed for "bonding the described member to acceptable substrates." At column 5, lines 7-15, Venable '812 states:

Accordingly, overall costs are reduced, even though the EPDM rubber/polyester matting membrane is itself more expensive than presently used membranes. Furthermore, the foamed, cellular adhesive was good "breathing" properties and this, combined with the vapor venting spacing provided between the adhesive and EPDM rubber, provides excellent venting of vapors. As a consequence, blistering is all but eliminated in the roofs of the present invention.

At column 5, lines 17-20, Venable '812 states "the adhesive bond established between the foamed adhesive and polyester matting is extremely strong." At column 1, lines 13-24, Venable '812 states that:

[a] relatively slow-setting polyurethane foam adhesive is employed, with an EPDM rubber membrane having a polyester matting secured thereto. . .the flexible membrane is applied so that the matting becomes at least partially embedded within the adhesive. Upon complete adhesive solidification, the membrane is secured in place, with a vapor venting spacing being provided between the adhesive material and rubber-like sheet. (Emphasis added.)

At column 1, lines 39-44, Venable '812 states "it is very difficult to properly bond the EPDM rubber directly with an adhesive, and accordingly the resultant roof is subject to wind uplifts. Secondly, such a construction provides little if any vapor ventilation capabilities, and thus such roofs are often prone to excessive blistering"

At column 1, lines 54-57, Venable '812 states that:

"it has been found that the use of such [fleece-like] matting permits the membrane to be strongly adhered to the adhesive, with the matting being at least partially embedded within the adhesive itself. At the same time, use of the matting makes it possible to fabricate the roof structure with a vapor venting spacing between the adhesive material and flexible membrane sheet."

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2. U.S. Patent No. 6,579,924 in the name of Georgeau et al.

Georgeau '924 discloses a pitch pocket and sealant. As discussed at column 1, lines 16-24, to seal penetrations of a low slope roof, a pitch pocket or pan surrounding the penetrating element is used, and a sealant is poured into the pitch pocket or pan around the penetrating element. The pourable sealer of Georgeau '924 may include silyl-terminated polyether (column 4, line 9). A hygroscopic plasticizer can be added to the one-part moisture curable, pourable sealer composition to allow moisture to be imbibed into the material. At column 5, lines 24-25, Georgeau '924 indicates that the moisture curable sealer may be used for sealing a roof penetration by dispensing the pourable sealer into a pitchpan formed around a roof member. At column 5, lines 29-32, Georgeau '924 states that "a pitch pan is any type of continuous wall or curve formed around a roof penetration through a water proof membrane covering a roof substrate, and into which a sealer composition is dispensed to provide a water-permeable barrier." Examples of one-part moisture curable, sealant composition are given at column 5, line 39 – column 6, line 13.

3. U.S. Patent No. 5,737,897 Issued to Naipawer, III.

Naipawer, III '897 discloses an insulation board composite 1 "which is designed for peal and stick application onto a waterproofing membrane and mechanical fastening to a roof deck." (column 1, lines 64-67). A tacky, pressure sensitive adhesive coating 2 is applied onto the insulation board, and a releasable sheet 3 is applied over the adhesive. In operation, the composite is applied onto a roof deck and attached thereto. The release paper 3 is then removed and a waterproofing membrane is then secured to the adhesive layer 2. At column 1, lines 9-10, Naipawer, III '897 states that "the insulation board is mechanically attached to a roof deck" (emphasis added). At column 1, lines 22-25, Naipawer, III '897 states that "it is an object of this invention to provide an insulation board composite; mechanically fastened to a roof deck" (emphasis added).

4. U.S. Patent No. 4,719,723 Issued to Van Wagoner.

Van Wagoner '723 discloses a membrane roofing system including a roofing membrane 26 "Fig. 1" on a concrete roof deck 16 as positioned both below a drainage cord 42 and insulation panels

40. At column 7, lines 47-54, Van Wagoner '723 states that a moisture vapor barrier 44 "may be adhered between the drainage board 42 and the closed cell insulation 46 by conventional adhesive compositions." At column 4, lines 58-61, Van Wagoner '723 states that "an external layer of aggregate, pavers or similar ballast is deposited on top of the insulation course of the panels to maintain the panels in position". At column 6, lines 20-27, Van Wagoner '723 states that:

"a water impermeable roofing membrane 26 has been applied to the roof or deck surface 16 by a conventional technique such as multiple applications of felt paper and hot melt bituminous compound as outlined above or an elasto/plastic single ply membrane such as modified bituminous membranes, polyvinyl chloride, ethylene propylene diene monomer, etc."

5. U.S. Patent No. 4,498,267 Issued to Beck.

Beck '267 discloses a simulated clay tile roof construction including roof panel members 2 supported on a roof by screws 6 with furring strips 7 supported at rafter members 8. At column 1, lines 43-53, Beck '627 states that "in order to minimize the cost of construction, while optimizing the strength and weight of roof panel members, a substantial portion of the area of the individual panel members is constructed of fiberglass reinforces gypsum, with only edged portions at raised simulated tile parts being of fiberglass reinforced plastic." The roof panel members 2 include cylindrically shaped, raised tile member portions 9 separated by flat portions 10. As shown in Fig. 1, the roof panel members 2 form an exterior layer of the roof construction.

B. Legal Considerations

Claims 1-27 have been rejected under 35 U.S.C. §112, first paragraph as failing to comply with the written description requirement; claims 1-2 and 4-15 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over the Venable U.S. Patent No. 4,996,812 in view of Georgeau et al. U.S. Patent No. 6,579,924; claim 3 has been rejected under 35 U.S.C. § 103(a) as being unpatentable over Venable U.S. Patent No. 4,996,812 in view of Georgeau et al. U.S. Patent No. 6,579,924 and further in view of Naipawer, III U.S. Patent No. 5,737,897; claims 5-14, 17-22, and 26 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Venable U.S. Patent No. 4,996,812 in view of Georgeau et al. U.S. Patent No. 6,579,924 and further in view of Van Wagoner U.S. Patent No.

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4,719,723; claims 15-16 and 23-25 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Venable U.S. Patent No. 4,996,812 in view of Georgeau et al. U.S. Patent No. 6,579,924 and Van Wagoner U.S. Patent No. 4,719,723 and further in view of Beck U.S. Patent No. 4,498,267; and claim 27 has been rejected under 35 U.S.C. § 103(a) as being unpatentable over Venable U.S. Patent No. 4,996,812 in view of Georgeau et al. U.S. Patent No. 6,579,924 and Van Wagoner U.S. Patent No. 4,719,723 and further in view of Naipawer, III U.S. Patent No. 5,737,987.

With respect to 35 U.S.C. §112, first paragraph, MPEP §2163.04 states that "the Examiner has the initial burden of presenting evidence or reasoning to explain why a person skilled in the art would not recognize in the disclosure a description of the invention defined by the claims."

With respect to obviousness, in proceedings before the Patent and Trademark Office the Examiner bears the burden of establishing a *prima facie* case of obviousness based upon the prior art. MPEP 2142; *In re Fritch*, 23 USPQ 2d 1780, 1783 (Fed. Cir. 1992). Applicants respectfully assert that the Examiner has also not yet met her burden of establishing a *prima facie* case of obviousness with respect to the rejected claims.

In rejecting claims under 35 U.S.C. §103, it is incumbent upon the Examiner to establish a factual basis to support the legal conclusion of obviousness. See *In re Fine*, 837 F.2d 1071, 1073, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988). In so doing, the Examiner must make the factual determinations set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 17, 148 USPQ 459, 467 (1966), viz., (1) the scope and content of the prior art; (2) the differences between the prior art and the claims at issue; and (3) the level of ordinary skill in the art. "[T]he examiner bears the initial burden, on review of the prior art or on any other group, of presenting a *prima facie* case of unpatentability." *In re Oetiker*, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992). Furthermore, "Rejections on obviousness grounds cannot be sustained by mere conclusory statements; instead there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness." *KSR Int'l Co. v. Teleflex Inc.*, 127 S. Ct. 1727, 1741, 82 USPQ2d 1385, 1396 (2007) (quoting *In re Kahn*, 441 F.3d 977, 988, 78 USPQ2d 1329, 1336 (Fed. Cir. 2006)). Also, "[A] patent composed of several elements is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art." *KSR* at 1741. Obviousness is then determined

on the basis of the evidence as a whole and the relative persuasiveness of the arguments. *See Oetiker*, 977 F.2d at 1445, 24 USPQ2d at 1444; *Piasecki*, 745 F.2d at 1472, 223 USPQ at 788.

1. Claims 1-27 stand rejected under 35 U.S.C. §112, first paragraph, as failing to comply with the written description requirement.

a. Claims 1-4

With respect to the requirements of 35 U.S.C. §112, first paragraph, MPEP 2163 states that "If a skilled artisan would have understood the inventor to be in possession of the claimed invention at the time of filing, even if every nuance of the claims is not explicitly described in the specification, then the adequate description requirement is met." citing *Vas-Cath*, 935 F.2d at 1563, 19 USPQ2d at 1116; *Martin v. Johnson*, 454 F.2d 746, 751, 172 USPQ 391, 395 (CCPA 1972) (stating "the description need not be in *ipsis verbis* [i.e., "in the same words"] to be sufficient"). MPEP 2163 also states that "there is no *in haec verba* requirement . . . the fundamental factual inquiry is whether the specification conveys with reasonable clarity to those skilled in the art that, as of the filing date sought, applicant was in possession of the invention as now claimed." citing *Vas-Cath, Inc., supra*.

As discussed above, independent claim 1 recites a roof structure including a roof substrate and "a waterproof membrane having an upper side and a lower side that is substantially free of fleece material". A moisture curing substantially non-volatile adhesive comprising a silyl-terminated polymer bonds the waterproof membrane to the roof substrate. At page 5, line 26 thru page 6, line 2, the present application states that "although fleece-backed waterproof membrane material is one aspect of the present invention, the invention is not limited to the use of such material and alternative waterproof membranes can be used without a fleece bonding surface". Such alternative membranes can be composed of ethylene propylene dimer (EPDM), polyvinyl chloride (PVC), polyisobutylene (PIB) and certain thermoplastic polyolefin (TPO) membranes. The invention further includes any waterproof membrane to which the described polyether moisture cure adhesive provides sufficient adhesion to form a permanent bond." (emphasis added) At page 8, lines 5-7, the present application states that "the above formulations exhibit fast setting properties, adhesion and bond strength and

rheological properties sufficient to install fleece-back waterproof membranes and most non-fleece-backed membrane [sic.] under field roofing conditions." (emphasis added)

Accordingly, the specification of the present application, as filed, provides specific examples of moisture curing silyl-terminated polyether adhesive as recited in claim 1, and further specifically states that these formulations can be utilized with "non-fleece-backed membranes under field roofing conditions."

Accordingly, it is clear that a skilled artisan would have understood that the inventor was indeed in possession of the invention of claim 1 at the time of filing, thus meeting the requirements of 35 U.S.C. §112, first paragraph. The Office Action dated September 6, 2007 states that "[N]ow the independent claim recites a membrane with a lower or first side free of fleece." The Office Action also states that "this text is not in the specification or originally filed disclosure." This statement is incorrect.

As discussed above, the specification as filed provides specific examples of adhesives as recited in claim 1, and specifically states that these formulations can be used with non-fleece-backed membranes.

b. Claims 5-6

As discussed above, independent claim 5 recites, among other features, a low slope roof structure and "a waterproof membrane having an upper side and a lower side". Claim 5 further recites "a moisture curing silyl-terminated polymer based adhesive ...bonding said waterproof membrane to said upper surface of said roof substrate". Thus, independent claim 5 is "generic" with respect to the existence of fleece on the waterproof membrane. As discussed above in connection with independent claim 1, the present application discloses specific examples of silyl-terminated polymers, and specifically states that "the above formulations exhibit fast setting properties, adhesion, and bond strength and real logical properties sufficient to install fleece-backed waterproof membranes and most non-fleece-back membrane [sic.] under field roofing conditions." (page 8, lines 5-7) (emphasis added). Accordingly, the specification as filed clearly provides support for claim 5, and a skilled artisan would have readily understood that the inventor was in possession of the invention of claim 5 at the time of filing.

c. Claim 7

Claim 7 depends from claim 5, and recites that "said waterproof membrane comprises a layer of EPDM rubber that does not include fleece backing material as discussed above in connection with independent claim 1, the present application specifically states that "[A]lternate waterproof membrane can be used without a fleece bonding surface. Such alternative membranes can be composed of ethylene propylene dimer (EPDM)" (page 5, lines 27-29) (emphasis added). Accordingly, the specification as filed provides specific support for the arrangement of claim 7, and one skilled in the art would have therefore understood the inventor to be in possession of the invention of claim 7 at the time of filing.

d. Claims 8-9

Independent claim 8 is somewhat similar to independent claim 5, and recites a low slope roof structure and "a waterproof flexible membrane covering said roof substrate, and defining a lower surface". Thus, the waterproof membrane of claim 8 is "generic" with respect to the presence of fleece. As discussed above in connection with independent claim 5, the specification of the present application as filed provides specific examples of adhesive moisture curing silyl-terminated polymer adhesive, and explicitly states that these adhesives can be used with both non-fleece and fleece-backed waterproof membranes.

e. Claims 10-15

Claim 10 depends from claim 9, and recites that "the flexible membrane includes a layer of fleece matter on one side". As discussed above in connection with independent claim 5, the specification as filed specifically states that the moisture curing adhesive can be used with flexible membranes having a layer of fleece matting on one side as recited in claim 10. Accordingly, it is clear that the inventor was in possession of the subject matter of claim 10 at the time of filing.

f. Claim 16

Independent claim 16 recites a low slope roof structure including a roof substrate comprising fiberglass reinforced gypsum board, a waterproof flexible membrane, and moisture curing substantially non-volatile adhesive disposed between roof substrate and the flexible membrane to bond

the flexible membrane to the substrate. The roof deck structure includes a layer of foam insulation below the fiberglass reinforced gypsum board. Accordingly, claim 16 is "generic" with respect to the existence of fleece on the waterproof membrane.

As discussed above in connection with independent claim 5, the specification as filed specifically states that the disclosed adhesive formulations may be used for both fleece-backed membranes, and non fleece-backed membranes. Applicant further notes that the fiberglass reinforced gypsum board and layer of foam insulation of claim 16 are described at page 8, lines 18-25 of the present application as filed. Accordingly, it is clear that one skilled in the art would have understood that the inventor was in possession of the claimed roof deck structure of claim 16 at the time the application was filed, thus meeting the requirements of the 35 U.S.C. §112, first paragraph.

g. Claims 17-20

Independent claim 17 recites a roof deck structure including a rigid low slope roof structure including foam insulation forming a roof substrate, a waterproof flexible membrane, and moisture curing adhesive bonding the flexible membrane to the roof substrate. Claim 17 further recites a fluted steel deck below the foam insulation, and moisture curing adhesive bonding the foam insulation to the steel deck without the use of mechanical fasteners. Thus, the waterproof flexible membrane of claim 17 is "generic" with respect to the fleece backing.

As discussed above in connection with independent claim 5, the specification of the present application, as filed, provides specific examples of moisture curing substantially non-volatile adhesive formulations, and specifically states that these formulations can be used to install both fleece-backed waterproof membranes and non-fleeced-backed membranes. Accordingly, one skilled in the art would have recognized that the inventor was in possession of the subject matter of claim 17 at the time the application was filed, thereby meeting the requirements of 35 U.S.C. §112, first paragraph.

h. Claims 21-25

Independent claim 21 recites a fluted steel deck, a substantially rigid panel disposed on the steel deck, and moisture-curing adhesive disposes between the steel deck and the substantially rigid panel. A flexible waterproof membrane is disposes above the substantially rigid panel. Accordingly, independent claim 21 is "generic" with respect to the existence of fleece on the waterproof membrane.

As discussed above in connection with independent claim 5, the specification of the present application as filed provides specific examples of moisture-curing adhesive formulations, and specifically states that these may be used to install both fleece-backed waterproof membranes and non-fleece-backed membranes. Furthermore, the use of moisture-curing adhesive to bond a panel to a steel deck is described at page 8, lines 18-25 of the application as filed. Accordingly, one skilled in the art would have understood that the inventor of the present application was in possession of the invention of claim 21 at the time of filing. Applicant notes that, according to MP2163, every nuance of the claims does not need to be specifically described in the specification.

i. Claim 26

Claim 26 depends from claim 21, and recites that "the waterproof membrane comprises a fleece-backed material". As discussed above in connection with independent claim 5, the specification of the present application, as filed, specifically states that the examples of moisture curing adhesives can be used with both fleece-backed waterproof membranes and non-fleece-backed membranes. Accordingly, the inventor was clearly in possession of the invention of claim 26, such that the requirements of 35 U.S.C. §112, first paragraph are met.

j. Claim 27

Claim 27 depends from claim 1, and recites that "the waterproof membrane comprises a fleece-backed PVC material at page 8, lines 24-25 of the application as filed, a PVC fleece-backed waterproof membrane is disclosed. Accordingly, the present inventor clearly had possession of the invention of claim 27, thereby meeting the requirements of 35 U.S.C. §112, first paragraph.

- 2. Claims 1-2 and 4-15 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Venable U.S. Patent No. 4,996,812 in view of Georgeau et al. U.S. Patent No. 6,579,924.**

a. Claims 1-2 and 4

As discussed above, independent claim 1 recites a roof structure including a roof substrate having an upper surface and a waterproof membrane having an upper side and a lower side that is

substantially frees of fleece material. Claim 1 also recites moisture curing substantially non-volatile adhesive comprising a silyl-terminated polymer bonding the waterproof membrane to the roof substrate.

As discussed above, Venable '812 discloses a membrane having a fleece like-matting. A two-component polyurethane adhesive with polyol and diisocyanate components. Venable '812 states that "the use of such matting permits the membrane to strongly adhered to the adhesive, with the matting being at least partially embedded within the adhesive itself" (column 1, lines 54-57), and that "it is very difficult to properly bond the EPDM rubber directly with an adhesive". (Column 1, lines 39-40) (emphasis added). Venable '812 also states that "[T]he foamed, cellular adhesive was [sic.] good "breathing" properties, and this, combined with the vapor venting spacing provided between the adhesive and EPDM rubber, provides excellent venting of vapors." (Column 5, lines 10-14). Venable '812 further states that "the adhesive bond established between the foamed adhesive and polyester matting is extremely strong". (Column 5, lines 18-19).

Neither Venable '812 nor Georgeau '924 provide any reason to use the sealant/adhesive of Georgeau '924 to adhere the membrane of Venable '812 to a roof substrate. Also, claim 1 recites that the waterproof membrane is free of fleece material, and Venable '812 teaches away from a membrane that is free of fleece material, and indicates that "it is very difficult to properly bond the EPDM rubber directly with an adhesive". Furthermore, the fleece of Venable '812 provides for venting of vapors. Thus, the fleece backed membrane of Venable '812 and two-part foamed adhesive of Venable '812 appear to work together to bond the membrane 18 to a roof. There is simply no disclosure in either Venable '812 or Georgeau '924 providing any reason to eliminate the fleece layer 22 of Venable '812 and further modify the roof by replacing the two-part spray-on foam with the sealant/adhesive of Georgeau '924.

Applicant notes that the two-part spray foam of Venable '812 produces toxic fumes, forcing the person using the equipment to wear a full body suit and respirator. Furthermore, Isocyoanates are classified as mutagens by the state of California, and use of the Venable '812 two-part foam adhesive raises significant environmental issues. Also, the spray equipment utilized to apply the Venable '812 foam is expensive and it may be difficult to use.

Applicant respectfully asserts that if use of moisture-curing adhesive as recited in claim 1, were actually obvious, those skilled in the art would have used such adhesive rather than continuing to use the Venable '812 adhesive with its significant and well-known problems.

Applicant reiterates that "a patent composed of several omits is not proved obvious merely by demonstrating that each of its elements, was independently, known in the prior art." *KSR, supra at 1741*.

Applicant also notes that "in order to render a later invention unpatentable for obviousness, the prior art must enable one skilled in the art to make and use the later invention, as opposed to the prior art itself being enabling. *In re Kumar*, 418 F.3d 1361, 76 USPQ2d 1048 (Fed. Cir. 2005)." Given that Venable '812 itself states that "it is very difficult to properly bond the EPDM rubber directly with an adhesive", Applicant asserts that the prior art is not enabling with respect to use of the sealant of Georgeau '924 in place of the two-component foam adhesive of Venable '812, particularly if the membrane is "substantially free of fleece material" as recited in independent claim 1.

b. Claims 5 and 6

As discussed above, independent claim 5 recites a roof deck structure including a rigid low slope roof structure and a waterproof membrane. Moisture curing silyl-terminated polymer based on adhesive is disposed on at least a portion of a lower side of the waterproof membrane in contact with an upper surface of the roof substrate, and bonds the waterproof membrane to the upper surface of the roof substrate.

Neither Venable '812 nor Georgeau '924, provide a factual basis to combine these references. As discussed above in connection with claim 1, those skilled in the art would not have continued to use the hazardous two-part adhesive of Venable '812 if it had actually been obvious to use the moisture curing adhesive of the present application.

c. Claim 7

As discussed above, claim 7 depends from claim 5, and recites that the weatherproof membrane comprises a layer of EPDM rubber that does not include fleece backing material. As discuss above in connection with independent claim 1, Venable '812 teaches that "it is very difficult to properly bond the EPDM rubber directly with an adhesive". Neither Venable '812 nor Georgeau '924

provide a reason to eliminate the fleece matting of Venable '812 and also replace the two-part foam adhesive of Venable '812 with the sealant/adhesive of Georgeau '924. As also discussed above, Venable '812 teaches that the fleece provides venting of vapors to prevent blistering.

d. Claims 8-15

Independent claim 8 recites a roof deck structure including a rigid low slope roof structure and a waterproof flexible membrane. A moisture curing substantially non-volatile adhesive comprising a silyl-terminated polymer is in contact with an upper surface of the roof substrate and a lower surface of the flexible membrane to bond the flexible membrane to the roof substrate.

As discussed above in connection with independent claims 1 and 5, neither Venable '812 nor Georgeau '924 provide any reason to utilize the sealant/adhesive of Georgeau '924 in place of the two-component polyurethane adhesive of Venable '812. As discussed above in connection with claim 1, those skilled in the art would not have continued to use the hazardous two-part adhesive of Venable '812 if it had actually been obvious to use the moisture curing adhesive of the present application.

- 3. Claim 3 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Venable U.S. Patent No. 4,996,812 in view of Georgeau et al. U.S. Patent No. 6,579,924, and further in view of Naipawer, III U.S. Patent No. 5,737,897.**

a. Claim 3

Claim 3 depends from claim 1, and recites that the waterproof membrane comprises a layer of PCV material. Claim 3 is believed to be allowable for those reasons set forth above in connection with independent claim 1. Furthermore, applicant asserts that there would be no reason to replace the fleece-backed membrane 18 of Venable '812 with a PVC membrane that is substantially free of fleece material, followed by further modification of Venable '812 to replace the two-component foam adhesive of Venable '812 with the sealant/adhesive of Georgeau '924. The references themselves do not teach that non-fleece PVC would adhesively bond even if such modifications were attempted.

- 4. Claim 5-14, 17-22, and 26 stand rejected as being unpatentable over Venable U.S. Patent No. 4,996,812 in view of Georgeau et al. U.S. Patent No. 6,579,924, and further in view of Van Wagoner U.S. Patent No. 4,719,723.**

a. Claims 5-6

As discussed above in connection with the rejection of independent claim 5 as being unpatentable over Venable in view of Georgeau, the references themselves do not provide any reason to modify Venable '812 by replacing the two-part spray foam adhesive of Venable '812 with the pourable sealant of Georgeau '924. As discussed above in connection with claim 1, those skilled in the art would not have continued to use the hazardous two-part adhesive of Venable '812 if it had actually been obvious to use the moisture curing adhesive of the present application.

Furthermore, as discussed above, Van Wagoner '723 discloses a roofing membrane 26 applied to a roof deck surface 16, with an insulating drainage course 42 and insulation panels 40 above the roofing membrane 26. An external layer of aggregate, pavers or similar ballast is deposited on top of the insulation course of Van Wagoner '723 to maintain the panels in position. Clearly, the roofing of Van Wagoner '723 is significantly different than the Venable '812 roof construction, and Van Wagoner '723 does not provide a reason to use the sealant/adhesive of Georgeau '924 in place of the two-component foam adhesive of Venable '812.

b. Claim 7

As discussed above, claim 7 depends from claim 5, and recites a layer of EPDM rubber that does not include fleece baking material. As also discussed above, Venable '812 states that "it is very difficult to properly bond the EPDM rubber directly within an adhesive". Neither Venable '812 nor Georgeau '924 provide any reason to eliminate the fleece matting of Venable '812, and further modify Venable '812 by substituting the sealant/adhesive of Georgeau '924 for the two-component polyurethane adhesive of Venable '812. Van Wager also does not provide any reason for such modification.

c. Claims 8-14

As discussed above, independent claim 8 recites a roof deck structure including a rigid low slope roof structure and a waterproof flexible membrane. A moisture curing substantially non-volatile adhesive comprising a silyl-terminated polymer bonds the flexible membrane to the roof substrate. As discussed above in connection with claim 1, those skilled in the art would not have continued to use

the hazardous two-part adhesive of Venable '812 if it had actually been obvious to use the moisture curing adhesive of the present application.

d. Claims 17-20

As discussed above, independent claim 17 recites a roof deck structure including a rigid low slope roof structure including foam insulation forming a roof substrate. A waterproof flexible membrane covers the roof substrate, and moisture curing substantially non-volatile adhesive is disposed between the roof substrate and the flexible membrane to thereby bond the flexible membrane to the roof substrate. The roof deck structure also includes a fluted steel deck below the foam insulation, and moisture adhering adhesive bonding the foam insulation to the steel deck without the use of mechanical fasteners.

As an initial matter, Venable '812 does not teach use of an adhesive to bond foam 14 to metal decking 12. Thus, the use of an adhesive to bond the foam 14 to metal decking 12 in Venable '812 is purely speculative. As discussed above, in rejecting claims under 35 U.S.C. §103, it is incumbent upon the Examiner to establish a factual basis to support the legal conclusion of obviousness, *In re Fine, supra*. Applicant notes that Fig. 3 of Venable '812 is a sectional view of a very small portion of the roof structure, and it is quite possible that mechanical fasteners are actually used to secure the foam 14 to the decking 12.

"To establish inherency, the extrinsic evidence must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient." MPEP 2112(IV), citing *In re Robertson*, 169 F.3d 743, 49 USPQ2d 1949, 1950-51 (Fed. Cir. 1999)(quoting *Continental Can Co. v. Monsanto Co.*, 948 F.2d 1264, 20 USPQ2d 1746, 1749 (Fed. Cir. 1991))(emphasis added). Applicant asserts that it is unreasonable to presume that, out of all of the possibilities for securing the foam 14 of Venable '812 to the metal decking 12, Venable '812 discloses precisely those features required to meet the limitations of applicants claimed invention despite any clear teaching in the reference that this is the case.

e. Claims 21-22 and 26

As discussed above, independent claim 21 recites a roof deck structure including foam insulation that is adhesively bonded to a fluted steel deck by a moisture curing adhesive without the use of mechanical fasteners. As discussed above, in connection with independent claim 17, Venable '812 itself does not teach use of an adhesive to bond a foam insulation to a steel deck. Applicant asserts that it is quite possible that the foam of Venable '812 is mechanically fastened to the steel deck. The use of adhesives, without mechanical fasteners, is clearly not "necessarily present" in Venable '812. Applicant notes again that "rejections on obvious grounds cannot be sustained by mere conclusory statements; instead there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness." *KSR, supra*

Applicant asserts that the use of adhesives to bond the foam 14 of Venable '812 to the decking 12 is purely speculative, and a proper factual basis for such an assertion has not been made.

- 5. Claim 15-16 and 23-25 stand rejected as being unpatentable over Venable U.S. Patent No. 4,996,812 in view of Georgeau et al. U.S. Patent No. 6,579,924, and further in view of Beck U.S. Patent No. 4,498,267.**

a. Claim 15

As discussed above, claim 15 depends from claim 8. Claim 15 is therefore believed to be allowable for those reasons set forth above in connection claim 8.

b. Claim 16

As discussed above, independent claim 16 recites a roof deck structure including a roof substrate comprising fiberglass reinforced gypsum board. A waterproof flexible membrane covers the roof substrate, and moisture curing adhesive bonds the membrane to the roof substrate. The roof deck structure includes a layer of foam insulation below the fiberglass reinforced gypsum board.

As discussed above in connection with claim 1, those skilled in the art would not have continued to use the hazardous two-part adhesive of Venable '812 if it had actually been obvious to use the moisture curing adhesive of the present application.

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c. Claims 23-25

Claims 23-25 depend from claim 21, and are therefore believed to be allowable for those reasons set forth above in connection with independent claim 21.

6. **Claim 27 stand rejected as being unpatentable over Venable U.S. Patent No. 4,996,812 in view of Georgeau et al. U.S. Patent No. 6,579,924, and further in view of Van Wagaoer U.S. Patent No. 4,719,723.**

a. Claim 27

Claim 27 depends from claim 21, and is therefore believed to be allowable for those reasons set forth above in connection with independent claim 21.


C. Conclusion

For the reasons set forth above, it is apparent that the specification, as filed, adequately describes the invention of claims 1-27, and that claims 1-27 define patentable subject matter when the cited references are properly considered in their entirety.

Accordingly, reversal of the rejections of these claims under 35 U.S.C. §112 and 35 U.S.C. §103(a) is respectively solicited.

Respectfully submitted,

6/30/08
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VIII. Appendix of Claims (37 CFR §41.37(c)(1)(viii))

Listing of Claims:

1. A roof structure for covering a roof substrate, comprising:
a roof substrate having an upper surface;
a waterproof membrane having an upper side and a lower side that is substantially free of fleece material;
a moisture curing substantially non-volatile adhesive comprising a silyl-terminated polymer disposed on at least a portion of said lower side of said waterproof membrane in contact with said upper surface of said roof substrate and bonding said waterproof membrane to said roof substrate to define a portion of a low slope roof of a building structure.
2. The roof structure of claim 1, wherein:
said silyl-terminated polymer comprises a silyl-terminated polyether.
3. The roof structure of claim 1, wherein:
said waterproof membrane comprises a layer of PVC material.
4. The roof structure of claim 1, wherein:
said waterproof membrane comprises a layer of EPDM rubber.
5. A roof deck structure, comprising:
a rigid low slope roof structure adapted to be supported at least in part by the walls of a building, said low slope roof structure having a roof substrate defining an upper surface;
a waterproof membrane having an upper side and a lower side;
a moisture curing silyl-terminated polymer based adhesive disposed on at least a portion of said lower side in contact with said upper surface of said roof substrate, and bonding said waterproof membrane to said upper surface of said roof substrate.

6. The roof deck structure of claim 5, wherein:
said polymer comprises a silyl-terminated polyether.
7. The roof structure of claim 5, wherein:
said waterproof membrane comprises a layer of EPDM rubber that does not include fleece backing material.
8. A roof deck structure, comprising:
a rigid low slope roof structure including a roof substrate having an upper surface;
a waterproof flexible membrane covering said roof substrate, and defining a lower surface;
a moisture curing substantially non-volatile adhesive comprising a silyl-terminated polymer in contact with the upper surface of the roof substrate and the lower surface of the flexible membrane to thereby bond the flexible membrane to the roof substrate.
9. The roof deck structure of claim 8, wherein:
the adhesive comprises a silyl-terminated polyether based adhesive.
10. The roof deck structure of claim 9, wherein:
the flexible membrane includes a layer of fleece matting on one side; and wherein:
at least a portion of the adhesive is disposed in the fleece.
11. The roof deck structure of claim 10, wherein:
the flexible membrane comprises a layer EPDM rubber having a thickness of about 0.040-0.070 inches thick.
12. The roof deck structure of claim 11, wherein:
the fleece matting has a thickness of about 0.040-0.080 inches.

13. The roof deck structure of claim 8, wherein:
the flexible membrane is bonded to the roof substrate and has a bond strength of at least one hundred sixty-five pounds per square foot.

14. The roof deck structure of claim 13, wherein:
the adhesive has a viscosity prior to curing of about 200,000 to 300,000 centipoise.

15. The roof deck structure of claim 8, wherein:
the roof substrate comprises fiberglass reinforced gypsum board.

16. A roof deck structure, comprising:
a rigid low slope roof structure including a roof substrate comprising fiberglass reinforced gypsum board;
a waterproof flexible membrane covering said roof substrate;
a moisture curing substantially non-volatile adhesive disposed between the roof substrate and the flexible membrane to thereby bond the flexible membrane to the roof substrate; and wherein:
the roof deck structure includes a layer of foam insulation below the fiberglass reinforced gypsum board.

17. A roof deck structure, comprising:
a rigid low slope roof structure including foam insulation forming a roof substrate;
a waterproof flexible membrane covering said roof substrate;
a moisture curing substantially non-volatile adhesive disposed between the roof substrate and the flexible membrane to thereby bond the flexible membrane to the roof substrate;
a fluted steel deck below the foam insulation; and
moisture curing adhesive bonding the foam insulation to the steel deck without the use of mechanical fasteners.

18. The roof deck structure of claim 17, including:
moisture curing adhesive bonding the foam insulation to the steel deck.
19. The roof deck structure of claim 8, wherein:
the adhesive includes a silyl-terminated polymer.
20. The roof deck structure of claim 8, wherein:
the adhesive includes an oxyalkylene polymer having at least one reactive silyl group at each end of the polymer molecule.
21. A roof deck structure, comprising:
a fluted steel deck having a plurality of elongated upper deck surfaces;
a substantially rigid panel disposed on the steel deck, the panel defining upper and lower surfaces;
moisture-curing adhesive disposed between the steel deck and the substantially rigid panel in contact with the upper deck surfaces and the lower surface of the substantially rigid panel; and
a flexible waterproof membrane disposed above the substantially rigid panel.
22. The roof deck structure of claim 21, wherein:
the substantially rigid panel comprises insulation board.
23. The roof deck structure of claim 22, including:
a layer of fiberglass reinforced gypsum board disposed between the insulation board and the waterproof membrane.

24. The roof deck structure of claim 23, including:
moisture curing adhesive adhesively securing the fiberglass reinforced gypsum board to the insulation board.
25. The roof deck structure of claim 23, including:
moisture curing adhesive securing the waterproof membrane to the fiberglass reinforce gypsum board.
26. The roof deck structure of claim 21, wherein:
the waterproof membrane comprises a fleece-backed material.
27. The roof deck structure of claim 21, wherein:
the waterproof membrane comprises a fleece-backed PVC material.

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IX. Evidence Appendix (37 CFR §41.37(c)(1)(ix))

NONE

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X. Related Proceedings Appendix (35 USC §41.37(c)(1)(x))

NONE